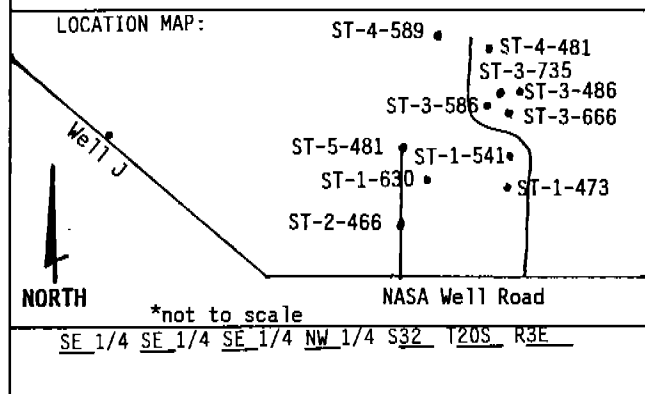


LITHOLOGIC LOG

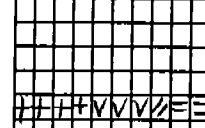
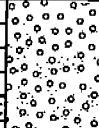
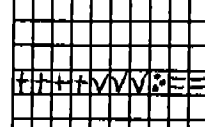
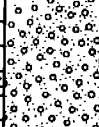
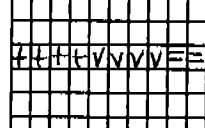

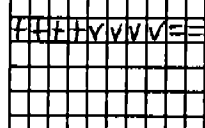

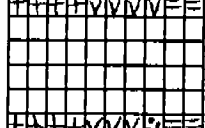

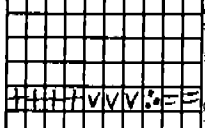
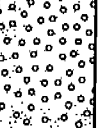


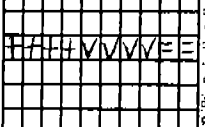
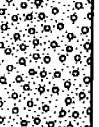
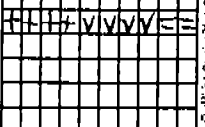

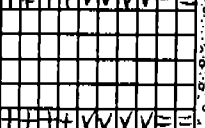







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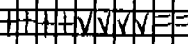

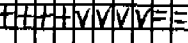




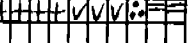

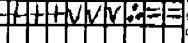


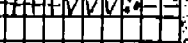


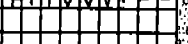







SITE ID: NASA-WSTF LOCATION ID: ST-3-735
 SITE COORDINATES (ft.):
 N 230843.63 E 400740.70
 GROUND ELEVATION (ft. MSL): 4496.62 (BC)
 STATE: NEW MEXICO COUNTY: DOÑA ANA
 DRILLING METHOD: Mud Rotary/Air Foam Rotary
 DRILLING CONTR.: Larjon Drilling Co.
 DATE STARTED: 07/22/92 DATE COMPLETED: 08/21/92
 FIELD REP.: D. Menzie
 COMMENTS: Drilled mud rotary pilot hole 0'-60' with 12 1/2" mill tooth bit. Reamed to 16" from 0'-60'. Set 60' of 14" steel surface casing. Drilled 60'-803' (7 7/8" borehole). Reamed 60'-800' to 12 1/2". Bedrock (tuff) at 610'. TD = 803'

| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|-----------|------|--------------------------|---------------------------------|---|
| 5 | =====+0 | | 37 | Cuttings (grab sample every 5') | 0'-610' Alluvium (Santa Fe Group): Cuttings are highly variable in lithology, grainsize and grain shape. Samples are multicolored when washed but clay imparts a light brown (5 YR 6/4) color to unwashed samples. Shapes range from angular chips and flakes to rounded alluvial grains. Grain size ranges from clay size to >1.0" in diameter. Clay content in samples ranges from <10%, originating from interbedded laminations, to 80% indicating thick clay zones. A clay-rich interval is evident at 0'-40' with 10% to 20% clay being present throughout the remaining section. The unit is an unconsolidated to consolidated, poorly sorted, pebble to boulder polygenetic conglomerate. Lithologies represented in the samples are predominantly limestone and various volcanics. Limestones are medium gray (N5) to dark gray (N3), micritic, and contain few allochems. Other sedimentary rocks present are greenish gray (5 GY 6/1) and pale red (5 R 6/2) laminated to non-laminated siltstones; and poorly sorted fine-grained sandstones. Grey chert is present in small percentages. Volcanic constituents increase downward in section and include a variety of rhyolites, tuffs, andesites and fine-grained granites. By 560', alluvium is considered volcanic-rich. |
| 10 | +++++VVVZ | | 42 | | |
| 15 | =====+Z | | 19 | | |
| 20 | =====++VZ | | 13 | | |
| 25 | =====+V | | 11 | | |
| 30 | =====HVZ | | 16 | | |
| 35 | =====++VZ | | 13 | | |
| 40 | +++++VVZ | | 12 | | |
| 45 | +++++VVZS | | 7 | | |
| 50 | +++++VVZ | | 8 | | |
| | | | | | 0'-45' Cutting clasts range in size from less than 0.1 inches to 0.5 inches and average 0.3 inches in size. Cuttings are subrounded to angular. |
| | | | | | 45'-60' Cuttings size increases to an average of 0.5 inches. Sizes range from 0.4 to 0.7 inches. Grains are subrounded to angular. |

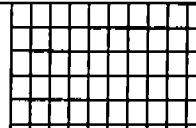

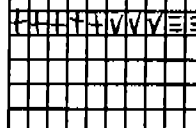
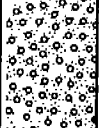
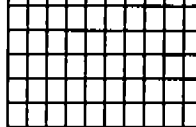
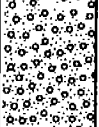
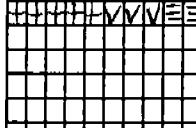



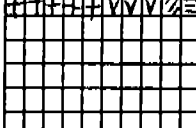

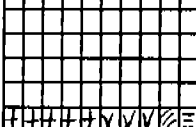

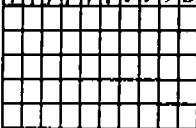



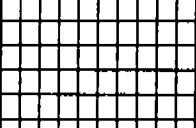



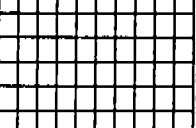





| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|----------|------|-----------------------------|-----------------------------|--|
| 50 | | | 8 | Cuttings (cont'd) | |
| 55 | | | 6 | | |
| 60 | | | 11 | | |
| 65 | | | 4 | | |
| 70 | | | 5 | | |
| 75 | | | 4 | | |
| 80 | | | 4 | | 80'-100' Clayey sand layer. >50% of cuttings are 0.1 inch or less. |
| 85 | | | 4 | | |
| 90 | | | 6 | | |
| 95 | | | 4 | | |
| 100 | | | 5 | | |
| 105 | | | 4 | | |
| 110 | | | 5 | | |
| 115 | | | 4 | | |

| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|---|---|-----------------------------|-----------------------------|------------------------|
| 115 |  |  | 4 | Cuttings (cont'd) | |
| 120 |  |  | 4 | | |
| 125 |  |  | 5 | | |
| 130 |  |  | 4 | | |
| 135 |  |  | 4 | | |
| 140 |  |  | 4 | | |
| 145 |  |  | 4 | | |
| 150 |  |  | 4 | | |
| 155 |  |  | 4 | | |
| 160 |  |  | 3 | | |
| 165 |  |  | 4 | | |
| 170 |  |  | 5 | | |
| 175 |  |  | 4 | | |
| 180 | | | 4 | | |

| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|---|---|-----------------------------|-----------------------------|--|
| 180 |  |  | 4 | Cuttings (cont'd) | 190'-203' Samples destroyed by downpour and flood on well pad. |
| 185 |  |  | 3 | | |
| 190 | |  | 4 | | |
| 195 | |  | 4 | | |
| 200 | |  | 3 | | |
| 205 |  |  | 2 (200'-203') | | |
| 210 |  |  | 1 (203'-210') | | |
| 215 | |  | 3 | | |
| 220 |  |  | 5 | | |
| 225 | |  | 4 | | |
| 230 |  |  | 4 | | |
| 235 | |  | 5 | | |
| 240 |  |  | 3 | | |
| 245 | |  | 4 | | |

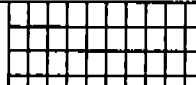





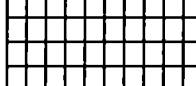

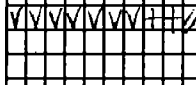











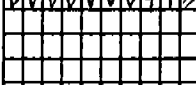





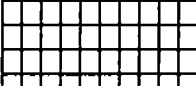

| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|----------|------|-----------------------------|-----------------------------|------------------------|
| 245 | | | 4 | Cuttings (cont'd) | |
| 250 | VVVV:EE | | 4 | | |
| 255 | | | 3 | | |
| 260 | VVVVV= | | 5 | | |
| 265 | | | 6 | | |
| 270 | VVVVV= | | 4 | | |
| 275 | | | 4 | | |
| 280 | VVVVV= | | 8 | | |
| 285 | | | 3 | | |
| 290 | VVVVV= | | 5 | | |
| 295 | | | 3 | | |
| 300 | VVVVV= | | 6 | | |
| 305 | | | 5 | | |
| 310 | VVVVV= | | 7 | | |

| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|----------|------|-----------------------------|-----------------------------|------------------------|
| 310 | | | 7 | Cuttings (cont'd) | |
| 315 | | | 5 | | |
| 320 | VVVVV | | 3 | | |
| 325 | | | 5 | | |
| 330 | VVVVV | | 5 | | |
| 335 | | | 3 | | |
| 340 | VVVVV | | 5 | | |
| 345 | | | 6 | | |
| 350 | VVVVV | | 3 | | |
| 355 | | | 7 | | |
| 360 | VVVVV | | 8 | | |
| 365 | | | 5 | | |
| 370 | VVVVV | | 5 | | |
| 375 | | | 6 | | |



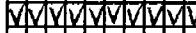
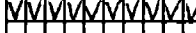
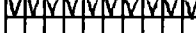
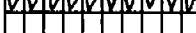
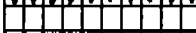
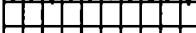
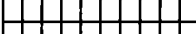
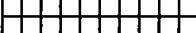


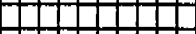
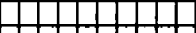
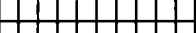
| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|---|---|-----------------------------|-----------------------------|------------------------|
| 375 |  |  | 6 | Cuttings (cont'd) | |
| 380 |  |  | 21 | | |
| 385 |  |  | 7 | | |
| 390 |  |  | 7 | | |
| 395 |  |  | 4 | | |
| 400 |  |  | 4 | | |
| 405 |  |  | 5 | | |
| 410 |  |  | 14 | | |
| 415 |  |  | 5 | | |
| 420 |  |  | 6 | | |
| 425 |  |  | 6 | | |
| 430 |  |  | 4 | | |
| 435 |  |  | 5 | | |
| 440 |  |  | 5 | | |

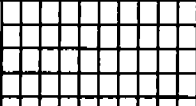
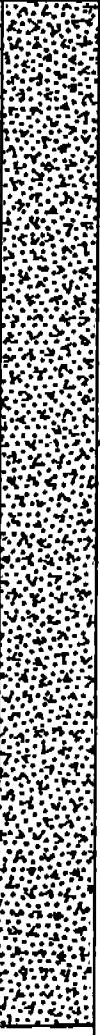
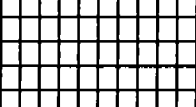
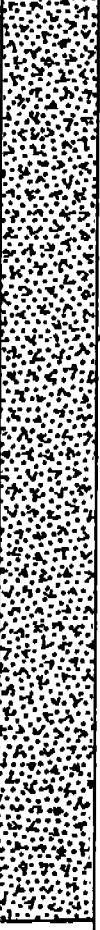

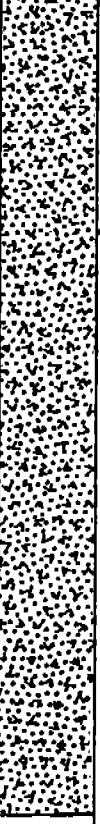

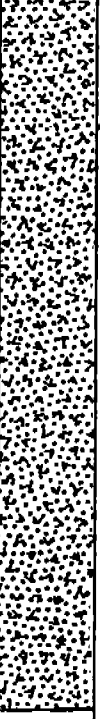

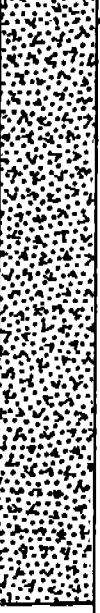



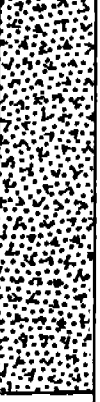
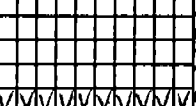



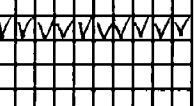
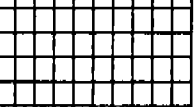
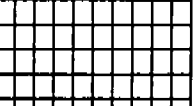
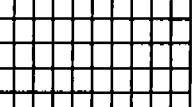
| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|----------|------|-----------------------------|-----------------------------|------------------------|
| 440 | | | 5 | Cuttings (cont'd) | |
| 445 | | | 4 | | |
| 450 | vvvvv/E | | 4 | | |
| 455 | | | 5 | | |
| 460 | vvvvv/E | | 4 | | |
| 465 | | | 3 | | |
| 470 | vvvvv/E | | 4 | | |
| 475 | | | 4 | | |
| 480 | vvvvv/E | | 3 | | |
| 485 | | | 4 | | |
| 490 | vvvvv/E | | 3 | | |
| 495 | | | 4 | | |
| 500 | vvvvv/E | | 3 | | |
| 505 | | | 2 | | |

| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|----------------|------|-----------------------------|-----------------------------|--|
| 505 | | | 2 | Cuttings (cont'd) | |
| 510 | ++++VVVVVZ= | | 4 | | 510'-520' Increase in formation grain size to 0.3 inches (average). |
| 515 | | | 4 | | |
| 520 | ++++VVVVVZ= | | 7 | | 520' Purple volcanic fraction is increasing. |
| 525 | | | 4 | | |
| 530 | VVVVVV++++Z= | | 3 | | |
| 535 | | | 6 | | |
| 540 | VVVVVV++++Z= | | 3 | | |
| 545 | | | 5 | | |
| 550 | VVVVVV++++Z= | | 6 | | |
| 555 | | | 5 | | |
| 560 | VVVVVVVV++++Z= | | 6 | | 560'-610' <u>Volcanic-rich Alluvium</u> : Predominate volcanic rock type is a grayish red (5 R 4/2) welded crystal-lithic ash flow tuff. White to gold rhyolites are present in minor percentages. Percent limestone and siltstone are decreasing. Cuttings may be angular chips to rounded formation gravels and range from <.10" to .5" in diameter. |
| 565 | | | 8 | | |
| 570 | VVVVVVVV++++Z= | | 7 | | |

| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|---|---|-----------------------------|-----------------------------|---|
| 570 |  |  | 7 | Cuttings (cont'd) | |
| 575 |  |  | 6 | | |
| 580 |  |  | 5 | | |
| 585 |  |  | 8 | | |
| 590 |  |  | 11 | | |
| 595 |  |  | 15 | | |
| 600 |  |  | 29 | | |
| 605 |  |  | 27 | | |
| 610 |  |  | 25 | | 610'-803' <u>Bedrock (Tuff)</u> : The unit is a pale red (5 R 6/2) to grayish red (5R 4/2) crystal-lithic ash flow tuff. Anhedral to subhedral phenocrysts are comprised of quartz and biotite and possibly feldspar. Phenocrysts average .05" in diameter and comprise up to 50% of the unit. Altered hornblende may be present in the groundmass. Groundmass is mottled to slightly flowbanded and may be welded and partially altered. Lithic fragments may be present in minor amounts. |
| 615 |  |  | 23 | | |
| 620 |  |  | 23 | | |
| 625 |  |  | 36 | | |
| 630 |  |  | 12 | | |
| 635 |  |  | 10 | | |

| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|----------|------|-----------------------------|-----------------------------|---|
| 635 | | | 10 | Cuttings (cont'd) | 650'-725' Calcite from mineralized fractures makes up 5% of sample. Cuttings are fairly uniform $\approx .1$ "-.2" and angular to subangular. |
| 640 | | | 13 | | |
| 645 | | | 12 | | |
| 650 | | | 11 | | |
| 655 | | | 8 | | |
| 660 | | | 10 | | |
| 665 | | | 8 | | |
| 670 | | | 9 | | |
| 675 | | | 9 | | |
| 680 | | | 9 | | |
| 685 | | | 9 | | |
| 690 | | | 11 | | |
| 695 | | | 6 | | |
| 700 | | | 8 | | |

| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|---|--|-----------------------------|-----------------------------|---|
| 700 |  |  | 8 | Cuttings (cont'd) | |
| 705 |  | | 6 | | |
| 710 |  | | 9 | | |
| 715 |  | | 10 | | |
| 720 |  | | 8 | | 720'-725' Cuttings are finer-grained. (<.1") |
| 725 |  | | 11 | | 725'-735' Cuttings are coarser grained .2"-.5". Subangular to rounded. |
| 730 |  | | 7 | | |
| 735 |  | | 10 | | 735'-740' Cuttings are angular again. Similar to 650'-725'. |
| 740 |  | | 12 | | 740'-745' 20% brown clay present. |
| 745 |  | | 15 | | |
| 750 |  | | 18 | | |
| 755 |  | | 11 | | |
| 760 |  | | 13 | | |
| 765 |  | | 20 | | |

| Depth | Visual % | Lith | Drilling Time Scale: min | Sample Type and Interval | Lithologic Description |
|-------|---|--|-----------------------------|-----------------------------|------------------------|
| 765 |  |  | 20 | Cuttings (cont'd) | |
| 770 |  |  | 24 | | |
| 775 |  |  | 10 | | |
| 780 |  |  | 10 | | |
| 785 |  |  | 10 | | |
| 790 |  |  | 10 | | |
| 795 |  |  | 15 | | |
| 800 |  |  | 8 (to 803') | | TD = 803' |
| 805 |  | | | | |
| 810 |  | | | | |
| 815 |  | | | | |
| 820 |  | | | | |
| 825 |  | | | | |
| 830 |  | | | | |